REMARKS

Claims 1-9 remain pending in the subject application. Claim 1 remains in independent form. After entry of the present Amendment, claims 4-8 are amended and claims 10-20 are added. As described below, there is full support in the specification for the amended claims 4-8 and the added claims 10-20. Accordingly, no new matter has been introduced.

Claims 4-9 are unexamined and have been objected to under 37 CFR 1.75(c) because they are in improper form due to multiple dependencies. The Applicant has amended claims 4-9 to eliminate the multiple dependencies and remedy these objections.

Relative to claims 10-11, support for these claims can be found on page 9 lines 12-15 of the instant patent application. Support for claims 12-20 can be found on page 8 lines 25-31 of the instant patent application. Therefore, no new matter is being introduced.

Claim Rejections Under 35 U.S.C. § 103(a):

Claims 1-3 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Pazos et al. (U.S. Pat. No. 5,689,012) in view of Herold et al. (U.S. Pat. No. 4,355,188). Claims 1-3 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaushiva et al. (U.S. Pat. No. 7,005,552) in view of Pazos et al.

To support the 35 U.S.C. § 103(a) rejections, the Examiner relies, in error, on the '012 patent which allegedly teaches steps A and B of the instant invention, recited for the Examiner's convenience below. The Examiner admits that the '012 patent fails to disclose steps C, D, and E of the instant invention, also recited below. To remedy this deficiency, the Examiner relies, in error, on the '188 patent to form the first 35 U.S.C. § 103(a) rejection.

Subsequently, the Examiner also relies in error on both the '552 patent and the '012 patent when combining these references to form the second 35 U.S.C. § 103(a) rejection.

The Applicant respectfully traverses these 35 U.S.C. § 103(a) rejections and submits that after entry of the instant Amendment, all claims including claims 1-3 and 9, amended claims 4-8, and added claims 10-20 are allowable. The Applicant also submits that that independent claim of the present invention provides a unique and non-obvious process for preparing polyether polyols having an end block of ethylene oxide by addition of alkylene oxides onto H-functional starter substances, in which

A) a polyether polyol precursor is prepared by means of double metal cyanide (DMC) catalysis in a semicontinuous mode of operation in which previously prepared polyether polyol together with the DMC catalyst are placed in a reactor and H-functional starter substance and propylene oxide are added continuously,

B) the polyether polyol precursor from stage A) is reacted with propylene oxide or an ethylene oxide/propylene oxide mixture in the presence of the DMC catalyst in a continuously operating reactor to give a polyether polyol intermediate,

C) the intermediate from stage B) is mixed with an alkali metal hydroxide as catalyst and

D) reacted with ethylene oxide in a continuously operating reactor to give the final product,

E) the catalyst is separated off from the final product obtained in stage D).

Further, the Applicant submits a Declaration Under 37 C.F.R. §1.132 which provides a perspective of one highly skilled in the art. The Declaration also incorporates the steps of polyether polyol synthesis, as described in the prior art cited by the Examiner, and was completed to demonstrate that even if the prior art references are combined, the polyether polyol of the instant invention is not successfully formed. The Declaration includes reference to Experiments 1-5. Experiment 1 details the preparation of the "previously prepared polyether

polyol" employed in step A of the instant invention. Experiment 2 details the DMC catalyzed preparation of the polyether polyol precursor formed according to step A. Experiment 3 details step B of the instant invention and includes continuous propoxylation of the polyether polyol precursor formed in step A to give a polyether polyol intermediate. Experiment 4 details **continuous** ethoxylation of the polyether polyol intermediate of step B, in the presence of KOH, according to steps C-E of the present invention, to form the polyether polyol of the instant invention. The polyether polyol formed from Experiment 4 is the polyether polyol of the present invention which is visually clear and has a turbidity index of 3.0 NTU units, as determined using a Hatch Ratio/XR nephelometer. Experiment 5 is a comparative example and includes ethoxylation of the polyether polyol intermediate of step B in a semi-batch (i.e., **discontinuous**) mode to form a comparative polyether polyol. In essence, Experiment 5 demonstrates an equivalent method as would be used if the prior art references, cited by the Examiner, were combined. Experiment 5 shows that combining the prior art references would not successfully produce the polyether polyol of the instant invention because of the **discontinuous** mode of operation. The comparative polyether polyol formed from Experiment 5 is different from the polyether polyol of Experiment 4, is visually cloudy, and has a turbidity index of 29 NTU units, as also determined using the Hatch Ratio/XR nephelometer.

In summary, the Declaration described above addresses the distinct differences between forming polyether polyols in continuously and discontinuously operating reactors and the resulting products. In doing so, Experiment 5 specifically shows that discontinuous formation of the comparative polyether polyol, as would result from the combination of the '012 patent and the '188 patent and/or the combination of the '552 patent and the '012 patent, is not

effective. This lack of effectiveness is illustrated by the differences in visual clarity of the comparative polyether polyol and the measured turbidity index, as described above.

***Prima Facie* Case of Obviousness**

As the Examiner is aware, to properly reject a claim under 35 U.S.C. § 103(a), a *prima facie* case of obviousness must be established. To establish this case, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See also MPEP § 2143.

The Applicant respectfully asserts that the Examiner has not established the requisite prima facie case of obviousness by failing to establish the first, second, and third criteria for both 35 U.S.C. § 103(a) rejections. Relative to the first criterion, there is no suggestion or motivation to combine the '012 patent with either of the '188 or '552 patents. Relative to the second criterion, even if the references are appropriately combinable, the combinations do not successfully produce the polyether polyol of the instant invention, as supported by the Declaration. Relative to the third criterion, even when combined, these references do not teach or suggest all of the claim limitations.

First Criterion: Suggestion or Motivation to Combine

The cases of *In re Sang Su Lee*[1] and *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*[2] clarify the law and the Examiner's responsibilities in demonstrating a suggestion or motivation to combine references. The more applicable and recent case,

[1] 277 F.3d 1338 (Fed. Cir. 2002).
[2] 411 F.3d 1332 (Fed. Cir. 2005).

Princeton, is discussed immediately below. In June of 2005, the Court of Appeals for the Federal Circuit (CAFC) reiterated the principles involved in assessing the differences between the prior art and the claimed invention when addressing the first criterion. See *Princeton*. In *Princeton*, citing *Ruiz v. A.B. Chance Co.*, 357 F.3d 1270, 1275 (Fed. Cir. 2004), the CAFC emphasized that a rejection under 35 U.S.C. § 103 specifically requires consideration of the claimed invention "as a whole" without importing hindsight into the obviousness determination. Relating to this "as a whole" issue, the CAFC went further to emphasize that

> [i]nventions typically are new combinations of existing principles or features. *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 698 (Fed. Cir. 1983) (noting that "virtually all [inventions] are combinations of old elements"). The "as a whole" instruction in title 35 prevents evaluation of the invention part by part. *Ruiz*, 357 F.3d at 1275. Without this important requirement, an obviousness assessment might successfully break an invention into its component parts, then find a prior art reference corresponding to each components. *Id.* This line of reasoning would import hindsight into the obviousness determination by using the invention as a roadmap to find its prior art components. Further, this improper method would discount the value of combining various existing features or principles in a new way to achieve a new result – often the essence of the invention. (emphasis added) *Id.*
>
> Contrary to this reasoning, section 103 requires assessment of the invention as a whole. *Id.* This "as a whole" assessment of the invention requires a showing that an artisan of ordinary skill in the art at the time of the invention, confronted by the same problems as the invention and with no knowledge of the claimed invention, would have selected the various elements from the prior art and combined them in the claimed manner. *Id.* In other words, section 103 requires some suggestion or motivation, before the invention itself, to make the new combination. (emphasis added).

In the spirit of the CAFC holding in *Princeton*, the Examiner must consider the instant invention as a whole and not simply as a combination of old elements. However, the Examiner does not do this. On page 3 of the Office Action, the Examiner breaks down the invention into component method steps and rejects the instant claims based on one aspect of one of the steps, i.e., the continuous reaction of ethylene oxide to form polyether polyols. To support this rejection, the Examiner's relies on the well established principle that batch and continuous

processes are not patentability distinct. Although generally correct, this principle should not be applied to "break down" components of the instant invention. The Examiner indirectly cites the discontinuous (batch) process of the '188 patent but is silent as to what processes are employed in the '552 patent. As described in greater detail below, the '552 patent also employs a discontinuous (batch) process. The Examiner's reliance on this principle demonstrates that the Examiner is breaking down the invention into component parts and is discounting the value of combining a known method step, i.e. continuous formation of polyether polyol, with other method steps, in a new way to achieve a new result, i.e., to form polyether polyols that have low turbidity indices via continuous reactions. Forming these polyether polyols via continuous reactions is the essence of the instant invention and is further explained both below and in the Declaration.

In accordance with the aforementioned arguments, the Applicant respectfully asserts that there is no suggestion or motivation to combine the references and that the Examiner has not appropriately established the first criterion of the *prima facie* case of obviousness.

Second Criterion: Reasonable Expectation of Success

Relative to the second criterion, even if the patents are appropriately combinable, these patents, when combined, will not successfully produce the polyether polyol of the instant invention. Neither the '188 nor the '552 patent disclose, teach, or suggest continuously reacting ethylene oxide to form a polyol in the manner of the instant invention. Instead, these patents disclose and demonstrate discontinuously reacting ethylene oxide to form a polyol, as explained in both the detailed descriptions and the examples of the '188 and '552 patents.

As introduced above and as supported by the Declaration, the preparation of polyether polyols in a continuously operating reactor is at the heart of the instant invention

and is distinguishable over preparation of polyether polyols in a discontinuously operating reactor. The Declaration demonstrates that polyether polyols formed according to the method of the instant invention, in a continuously operating reactor, have a turbidity index of 3.0 NTU units and are visually transparent, i.e., clear. The Declaration also demonstrates that polyether polyols formed in a discontinuously operating reactor have a turbidity index of 29 NTU units and are visually cloudy. As such, the combination of the '012 patent with either of the '188 or '552 patents will not produce the polyether polyol of the instant invention and instead will produce a different polyether polyol that has a higher turbidity index. Accordingly, the Applicant submits that the Examiner has not appropriately established the second criterion of the *prima facie* case of obviousness.

Third Criterion: Combined References Must Teach Or Suggest All Claim Limitations

Relative to the third criterion, even if the patents are appropriately combinable, these patents, when combined, must teach or suggest all claim limitations. The Applicant respectfully asserts that when combined, these patents do not teach or suggest all claim limitations.

The Applicant makes this assertion because the '012 patent does not disclose, teach, or suggest step A of the instant invention which requires preparing a polyether polyol precursor by means of a DMC catalyst in a semicontinuous mode of operation wherein previously prepared polyether polyol together with the DMC catalyst are placed in a reactor and H-functional starter substance and propylene oxide are added continuously. Specifically, the '012 patent does not teach the preparation of a polyether polyol precursor in the semicontinuous mode of operation by propylene oxide addition to a previously prepared polyether polyol in the presence of a DMC catalyst. According to the '012 patent, a DMC catalyst/initial starter mixture is established in a continuous reactor to which one or more alkylene oxides and one ore

more starters are continuously added. Also, fresh DMC catalyst and/or additional amounts of the mixture of the DMC catalyst and the initial starter may be continuously added to the reactor. This process described above, which also happens to be the process that is claimed in the '012 patent, corresponds to step B of the instant invention and not step A. Step B requires reacting the polyether polyol precursor from stage A) with propylene oxide or an ethylene oxide/propylene oxide mixture in the presence of the DMC catalyst in a continuously operating reactor to give a polyether polyol intermediate,

In fact, the '012 patent is silent on how the DMC catalyst/initial starter mixture is produced, which would correlate to the starter substance of step A. Although in col. 11, lines 56-64, the term "starter," as employed in the phrase "DMC catalyst/initial starter," is described, this description is insufficient. This description merely states that "starter" refers to an oxyalkylatable molecule of any molecular weight. This oxyalkalatable molecule may be a low molecular weight starter molecule, e.g., propylene glycol, dipropylene glycol, glycerine, a three mole oxypropylate of glycerine, etc, or may be a much higher molecular weight molecule, e.g., the product of desired molecular weight. This description does not describe how the DMC catalyst/initial starter mixture is produced. Thus, due to this lack of disclosure, any combination of the patents cited by the Examiner is incorrect and does not satisfy the third criterion. Accordingly, the Applicant submits that the Examiner has not appropriately established the *prima facie* case of obviousness.

Additionally, neither the '188 nor the '552 patent disclose, teach, or suggest continuously reacting ethylene oxide to form a polyether polyol in the manner of the instant invention. Instead, both of these patents disclose discontinuously reacting ethylene oxide to produce a polyol. Therefore, neither the '188 or '552 patents disclose step D of the instant

invention which requires reacting the intermediate from step B with ethylene oxide in a continuously operating reactor to give the final product, i.e., the polyether polyol of the instant invention.

Relative to the '188 patent, the Examiner's statement on page 3 recognizes that the '188 does not disclose reacting ethylene oxide in a continuously operating reactor and therefore does not disclose step D of the instant invention. Relative to the '552 patent, the detailed description and Examples of the '552 patent disclose and demonstrate reacting ethylene oxide in a discontinuously operating reactor. Specifically, the '552 patent teaches an overall discontinuous process, as set forth in col. 4 lines 30 to 62 and in claim 1. This process includes preparing ethylene oxide capped polyether polyols by charging a reactor with starter containing acid sufficient to acidify residual basicity in the reactor from a previous batch of ethylene oxide capped polyol. The process also includes adding and activating a DMC catalyst, feeding oxyalkylenes to the reactor to produce a DMC-catalyzed polyol, adding a basic catalyst to the DMC-catalyzed polyol, and ethoxylating the mixture to produce an ethylene oxide capped polyol. The residue from this batch in the reactor is a basic heel which is acidified with the starter charge of the subsequent batch. This description of the discontinuous process illustrates that the '552 patent does not disclose reacting ethylene oxide in a continuously operating reactor and thus, does not disclose step D of the instant invention.

In accordance with the aforementioned arguments, the Applicant respectfully submits that combining the '012 patent and either of the '188 and '552 patents does not teach or suggest all of the claim limitations of the instant invention. The Applicant also submits that the Examiner has not appropriately established the third criterion of the *prima facie* case of obviousness.

Graham Factual Inquiry

In addition to the *prima facie* arguments addressed above, the Applicant further asserts that the instant invention is non-obvious in view of a Graham factual inquiry. For arguments sake, even if it is assumed that an appropriate *prima facie* case can be established, the subject Declaration demonstrates unexpected results of forming the polyether polyol via a continuous method, in accordance with the secondary factors identified in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). These unexpected results include continuously forming polyether polyols which have lower turbidity indices than polyether polyols formed discontinuously. These results further demonstrate the non-obviousness nature of the instant invention.

Conclusion

Overall, there is no suggestion or motivation to combine the '012 patent and either of the '188 and '552 patents to render the instant invention obvious, as described above. Also, even if combined, these references would not successfully produce the polyether polyol of the instant invention and do not teach or suggest all of the claim limitations. Further, even if it is assumed that an appropriate *prima facie* case can be established, the subject Declaration demonstrates unexpected results of forming the polyether polyol via a continuous method, in accordance with the secondary factors identified in *Graham v. John Deere*, thereby making the instant invention non-obvious.

In accordance with the previous arguments, the Applicant submits that the 35 U.S.C. §103(a) rejections of the claims 1-3 are overcome and that these claims are allowable. The Applicant also respectfully submits that the amended claims 4-8, claim 9, and the added

dependent claims 10-20 are also allowable as these claims depend either directly or indirectly on claims 1-3.

In view of the remarks set forth above, the Applicant submits that the claims are in condition for allowance and respectfully requests such allowance. The Commissioner is authorized to charge the Deposit Account No. 08-2789, in the name of Howard & Howard Attorneys, P.C., for any fees or credit the account for any overpayment.

Respectfully submitted,

HOWARD & HOWARD ATTORNEYS

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Date

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